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EXAMINER	
PRENDERGAST, ROBERTA D	
ART UNIT	**PAPER NUMBER**
2671	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/039,187	Applicant(s) YU ET AL.	
	Examiner Roberta Prendergast	Art Unit 2671	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 February 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 December 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "174B" has been used to designate both "guide curve 174B" and "section curve 174A" in fig. 4B surface elements 170 and 240. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the examiner does not accept the changes, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Harada et al. U.S. Patent No. 5345546.

Referring to claim 1, Harada et al. teaches a method for interfacing with a surface within a computer-aided drawing environment, comprising: determining that a plurality of

curves operable to define the surface constitute a P x 1 surface condition, a P x 1 surface condition being defined by a number of first curves equal to P and only one second curve, wherein P is an integer greater than zero (Abstract; Fig. 3A; column 2, lines 14-20, 31-35, and 47-51, i.e. it is understood that the boundary curve is the second curve separating two surfaces and the first curves P are the curves that are connected at the two ends of the boundary curve); in response to determining that a plurality of curves constitute a P x 1 surface condition, converting the P x 1 surface condition into an N x M surface condition, an N x M surface condition being defined by a number of third curves equal to N and a number of fourth curves equal to M, wherein N and M are integers greater than one; constructing an N x M surface under the N x M surface condition (Fig. 3D); and modifying the N x M surface to edit a drawing (Figs. 3A-3F; column 5, lines 27-54, i.e. two Bezier curves C(j,a) and C(j,b) are generated along the spine curve and are the new M second curves and arcs A(2j) and A(2j-2) are the new N first curves thereby converting the Px1 surface into an NxM surface under the NxM surface condition that n=4 and n Gregory Patches are then generated thereby modifying the NxM surface to edit a drawing).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harada et al. U.S. Patent No. 5345546 in view of Konno et al. U.S. Patent No. 5619625.

Referring to claim 2, the rationale for claim 1 is incorporated herein, Harada et al. teaches the method of Claim 1, wherein converting the P x 1 surface condition into an N x M surface condition comprises generating Gregory Patches having tangential continuity but does not specifically teach generating at least one auxiliary curve that is substantially continuous with any adjoining surfaces of a surface having the P x 1 surface condition and compatible with the number of first curves and the only one second curve that define the P x 1 surface condition.

Konno et al. teaches generating at least one auxiliary curve that is substantially continuous with any adjoining surfaces of a surface having the P x 1 surface condition and compatible with the number of first curves and the only one second curve that define the P x 1 surface condition (Figs. 20-21; column 5, lines 20-29 and 35-48, i.e. the G^1 continuity of the boundary curve is checked at the endpoints and saved in memory and then used as the condition of continuity when generating auxiliary curves thereby ensuring that the auxiliary curve is compatible with the number of first curves and the one second curve).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Harada et al. to include generating at least one auxiliary curve that is substantially continuous with any adjoining surfaces of a surface having the P x 1 surface condition and compatible with the number of first curves and the only one second curve that define the P x 1 surface

condition thereby providing a free-form surface generation method that has the following advantageous features; (1) joining smoothly two adjacent free-form surfaces sharing a boundary curve of any type (e.g., composite curve) by creating interior control points determined by the condition of connection on the boundary, which is derived from the condition of continuity on the boundary, which is determined by the boundary curve and other curves connected thereto; (2) generating free-form surfaces smoothly connected to each other by creating the control points for all the boundary curves and combining those control points; (3) generating a free-form surface in (2) which is smoothly joined to adjacent Gregory patches; (4) generating a free-form surface in (2) which is smoothly joined to adjacent rational boundary Gregory patches; (5) representing complex curve mesh by as few curves as possible in (2); (6) interpolating only one, if possible, surface into curve mesh in (2); and (7) keeping C^n continuity on a surface within the boundary curves (Konno et al. column 3, lines 8-27).

Referring to claim 3, the rationale for claim 1 is incorporated herein, Harada et al. teaches the method of Claim 1 but does not specifically teach wherein converting the P x 1 surface condition into an N x M surface condition comprises generating an N x M surface condition to replace the P x 1 surface condition.

Konno et al. teaches wherein converting the P x 1 surface condition into an N x M surface condition comprises generating an N x M surface condition to replace the P x 1 surface condition (Figs. 11-13; column 11, lines 23-39, i.e. a plurality of Gregory patches are generated thereby creating an NxM surface condition to replace the Px1 surface condition).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Harada et al. to include wherein converting the P x 1 surface condition into an N x M surface condition comprises generating an N x M surface condition to replace the P x 1 surface condition thereby providing a free-form surface generation method that has the following advantageous features; (1) joining smoothly two adjacent free-form surfaces sharing a boundary curve of any type (e.g., composite curve) by creating interior control points determined by the condition of connection on the boundary, which is derived from the condition of continuity on the boundary, which is determined by the boundary curve and other curves connected thereto; (2) generating free-form surfaces smoothly connected to each other by creating the control points for all the boundary curves and combining those control points; (3) generating a free-form surface in (2) which is smoothly joined to adjacent Gregory patches; (4) generating a free-form surface in (2) which is smoothly joined to adjacent rational boundary Gregory patches; (5) representing complex curve mesh by as few curves as possible in (2); (6) interpolating only one, if possible, surface into curve mesh in (2); and (7) keeping C^n continuity on a surface within the boundary curves (Konno et al. column 3, lines 8-27).

Referring to claim 4, the rationale for claim 1 is incorporated herein, Harada et al. teaches the method of claim 1 but does not specifically teach wherein converting the Px1 surface condition into an NxM surface condition comprises generating an NxM surface condition defined by the third and fourth curves such third and fourth curves are

defined by mathematical equations all having an order no greater than mathematical equations defining the first and second curves.

Konno et al. teaches wherein converting the Px1 surface condition into an NxM surface condition comprises generating an NxM surface condition defined by the third and fourth curves such third and fourth curves are defined by mathematical equations all having an order no greater than mathematical equations defining the first and second curves (column 5, lines 20-48; column 11, lines 56-65, i.e. the third and fourth curves are generated according to the control points and weights of the boundary curve whether the curve is rational or polynomial and thus is defined by mathematical equations having an order no greater than the first and second curves equations).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Harada et al. to include generating at least one auxiliary curve that is substantially continuous with any adjoining surfaces of a surface having the P x 1 surface condition and compatible with the number of first curves and the only one second curve that define the P x 1 surface condition thereby providing a free-form surface generation method that has the following advantageous features; (1) joining smoothly two adjacent free-form surfaces sharing a boundary curve of any type (e.g., composite curve) by creating interior control points determined by the condition of connection on the boundary, which is derived from the condition of continuity on the boundary, which is determined by the boundary curve and other curves connected thereto; (2) generating free-form surfaces smoothly connected to each other by creating the control points for all the boundary curves and combining

those control points; (3) generating a free-form surface in (2) which is smoothly joined to adjacent Gregory patches; (4) generating a free-form surface in (2) which is smoothly joined to adjacent rational boundary Gregory patches; (5) representing complex curve mesh by as few curves as possible in (2); (6) interpolating only one, if possible, surface into curve mesh in (2); and (7) keeping C^n continuity on a surface within the boundary curves (Konno et al. column 3, lines 8-27).

Referring to claim 5, the rationale for claim 1 is incorporated herein, Harada et al. teaches the method of claim 1 but does not specifically teach processing the first curves and the second curve so that each one of the first curves and second curve are compatible with each other of first curves and the second curve.

Konno et al. teaches processing the first curves and the second curve so that each one of the first curves and second curve are compatible with each other of first curves and the second curve (Fig. 16; column 11, lines 57-65, i.e. it is understood that generating a curve mesh in which the various Gregory patches that correspond to the various first curves are joined together at the second boundary curves is processing the first curves and second curve so that they are compatible with each other).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Harada et al. to include generating at least one auxiliary curve that is substantially continuous with any adjoining surfaces of a surface having the P x 1 surface condition and compatible with the number of first curves and the only one second curve that define the P x 1 surface condition thereby providing a free-form surface generation method that has the following

advantageous features; (1) joining smoothly two adjacent free-form surfaces sharing a boundary curve of any type (e.g., composite curve) by creating interior control points determined by the condition of connection on the boundary, which is derived from the condition of continuity on the boundary, which is determined by the boundary curve and other curves connected thereto; (2) generating free-form surfaces smoothly connected to each other by creating the control points for all the boundary curves and combining those control points; (3) generating a free-form surface in (2) which is smoothly joined to adjacent Gregory patches; (4) generating a free-form surface in (2) which is smoothly joined to adjacent rational boundary Gregory patches; (5) representing complex curve mesh by as few curves as possible in (2); (6) interpolating only one, if possible, surface into curve mesh in (2); and (7) keeping C^n continuity on a surface within the boundary curves (Konno et al. column 3, lines 8-27).

Referring to claim 6, the rationale for claim 1 is incorporated herein, Harada et al. teaches the method claim 1, but does not specifically teach modifying additional surfaces having the condition to edit the drawing.

Konno et al. teaches further modifying additional surfaces having the condition to edit the drawing (Fig. 16; column 11, lines 57-65, i.e. it is understood that generating a curve mesh in which the various Gregory patches that correspond to the various first curves are joined together at the second boundary curves is processing the first curves and second curve so that they are compatible with each other for additional surfaces).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Harada et al. to include

generating at least one auxiliary curve that is substantially continuous with any adjoining surfaces of a surface having the P x 1 surface condition and compatible with the number of first curves and the only one second curve that define the P x 1 surface condition thereby providing a free-form surface generation method that has the following advantageous features; (1) joining smoothly two adjacent free-form surfaces sharing a boundary curve of any type (e.g., composite curve) by creating interior control points determined by the condition of connection on the boundary, which is derived from the condition of continuity on the boundary, which is determined by the boundary curve and other curves connected thereto; (2) generating free-form surfaces smoothly connected to each other by creating the control points for all the boundary curves and combining those control points; (3) generating a free-form surface in (2) which is smoothly joined to adjacent Gregory patches; (4) generating a free-form surface in (2) which is smoothly joined to adjacent rational boundary Gregory patches; (5) representing complex curve mesh by as few curves as possible in (2); (6) interpolating only one, if possible, surface into curve mesh in (2); and (7) keeping C^n continuity on a surface within the boundary curves (Konno et al. column 3, lines 8-27).

Referring to claim 7, the rationale for claims 1 and 2 is incorporated herein, claim 7 is similar in scope to claims 1 and 2 and are rejected under the same rationale.

Referring to claims 12 and 18, the rationale for claim 2 is incorporated herein, Harada et al. teaches a system for performing the methods of claims 12 and 18 but does not specifically teach a software program stored on a computer readable medium and operable, when executed on a processor to perform the methods of claims 7 and 2.

It would have been obvious to one having ordinary skill in the art at the time the invention was made that a computer aided drafting system capable of performing the method described would necessarily comprise a software program stored on a computer readable medium and operable, when executed on a processor to perform the methods of claims 7 and 2 as described above.

Referring to claims 8-11, 13-17, and 19-23 the rationale for claims 1-6, 7, 12 and 18 are incorporated herein, claims 8-11, 13-17, and 19-23 are similar in scope to claims 1-6, 7, 12 and 18 and are rejected under the same rationale.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following U.S. Patents are cited to further show the state of the art with respect to generating continuous curves.

Joonishi et al. U.S. Patent No. 4829456

Peterson et al. U.S. Patent No. 5428718

Kuriyama et al. U.S. Patent No. 5459821

Oliver U.S. Patent No. 5510995

Ooka et al. U.S. Patent No. 5557719

Tankelevich U.S. Patent No. 5594852

Harashima U.S. Patent No. 5608855

Konno et al. U.S. Patent No. 5883631

Tankelevich U.S. Patent No. 6014148

Newell U.S. Patent No. 6111588

Litke et al. U.S. Patent No. 6603473

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Roberta Prendergast whose telephone number is (571) 272-7647. The examiner can normally be reached on M-F 7:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on (571) 272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RP

UChauhan

ULKA J. CHAUHAN
PRIMARY EXAMINER